

# Problem Statement: Bank of Portugal Telephone Campaign Predicting Model

*Jess Zhang*

*April 9, 2018*

## Project Background

Bank of Portugal ses telephone campaigns to sell term deposits. The campaign team from Bank of Portugal wants to be able to predict the campaign outcome and develop strategies to improve its campaign effecitveness. The team has collected its past campaign data and stored the information in a csv file.

## Stakeholders

The key players who will be involved in this project are:

- John Smith – Campaign Manager from Bank of Portugal’s Telemarketing department. He is the main stakeholder and point of contact for Bank of Portugal. John and his team will be using the model to analyze their client base and develop campaign strategy accordingly.  
Email: John.Smith@bancdeportugal.com
- Ashley Harvey – Data Analyst from Bank of Portual. Her job is to collect and record campaign data. Once the model is deployed, Ashley will be the primary user of this model and to report results to John.  
Email: Ashley.Harvey@bancdeportugal.com
- Jessica Zhang – Data Scientist from CSX415. She is the assigned to this project to develop an effective machine learning model to predict campaign outcome therefore help Bank of Portugal to understand and improve their campaign effectiveness. Email: Jesszh@Gmail.com
- Nick Nolasco – Data Engineer from CSX415. He is assigned to this project to analyze and clean the dataset provided by Bank of Portugal so the data scientist can analyze and train the data effeciently.  
Email: Nick.N@gmail.com

## Project Scope

Many factors, such as age, job, and loan amount can affect people’s banking decisions. Bank of Portugal believes it needs to develop a better targeted marketing strategy towards different profile groups. The goal of this project is to provide the campaign department with meaningful grouping of its clients from past campaigning data.

The current campaign success rate from this dataset is at 23.6%, which means more than 75 percent of calls yield no deposit. In order to better utilize staffs’ time, the campaign manager needs to be able to first “predict” the success likelihood and then direct his team with appropriate actions. Since there is no pre-existing model to compare with, the CSX415 data science team will use a “naive analysis” as the baseline.

The campaign manager determines that a model with 80 percent accuracy will be useful. if the model that yields a less than 75 percent accuracy will not be useful at all.

Developing of the marketing strategy is outside of the scope of this project.

A few algorithms will be run and the best suited model will be built to analyze the given dataset. The CSX425 team will share and discuss the analysis with the campaign manager of Bank of Portugal. The campaign manager and his team can continue to use the model to analyze data in the future.

The delivered model will work with additional data in the dataset. However, the model may not work if the client adds or removes columns from the dataset without consulting this project team.

## Benefits of the Project

With a model which can predict at least 80 percent of the outcome, the campaign manager can focus most of his team's effort on the clients who are most likely to make a term deposit during busy season and call the rest during low season.

The campaign team can also develop different call tactics towards different profile groups therefore improve the overall campaign effectiveness.

With future data gathering, the prediction accuracy of the model will continue to improve. The campaign manager can further improve his strategy.

## Estimated Risks

It is reasonable to believe that there are patterns can be generated from the given dataset. It is unlikely however possible that no meaningful pattern can be identified from given data due to insufficient data.

## Delivery Timeline

The CSX415 project team will be working on this project for the next 2 months. One data scientist and one data engineer will be working on the model and analysis full-time. Below is the schedule of the deliverables:

Milestone one: 4/30/2018

- The CSX team will deliver the preliminary result to the client on 4/30/2018.
- The CSX team will discuss the final delivery date with Bank of Portugal.
- The project scope and final delivery date can be adjusted based on the result of deliverable one, upon the mutual agreement of both CSX415 team and Bank of Portugal.

Final Delivery: 5/31/2018

- The estimated final delivery date is May 31st, 2018. The CSX415 team will give a final demo to the campaign team from Bank of Portugal on this date.
- The CSX415 team will transfer the entire code base and analysis result to Bank of Portugal.
- The CSX415 team will train one representative data analyst from Bank of Portugal on the usage and the basic maintenance of the model.

## Client Responsibilities After Delivery

Once deployed, the data model should be run and reviewed as needed before the campaign planning starts.

New campaign data should be updated and the model should be retrained as the dataset changes.

**Do not change the format of the data or the model may not run again!**

Since the users of this model may not have sufficient knowledge about machine learning, it is possible for someone to accidentally remove or damage the model or one of the supporting files. Weekly backup of the data as well as all files from this deliverable is highly recommended.

The data model's performance will improve with more data gathering and training. However, after a period of time, the new data may be different from the original data enough that the difference will affect the model performance negatively. CSX41 recommends Bank of Portugal to bring the model back for performance tuning once the model performance decreases more than 10 percent, or annually, whichever comes first.

## Data Source

Bank Marketing Data is taken from <http://archive.ics.uci.edu/ml/datasets/Bank+Marketing> and placed under /data folder.